

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

Pumping Plant for Water Control

(Number)

Code 533

DEFINITION

A pumping facility installed to transfer water for a conservation need, including removing excess surface or ground water; filling ponds, ditches or wetlands; or pumping from wells, ponds, streams, and other sources.

PURPOSES

To provide a dependable water source or disposal facility for water management on wetlands or to provide a water supply for such purposes as irrigation, recreation, livestock, or wildlife.

CONDITIONS WHERE PRACTICE APPLIES

Wherever water must be pumped to accomplish a conservation objective, which may include, but is not limited to one of the following:

- To provide a water supply for such purposes as irrigation, recreation, livestock, or wildlife.
- To maintain critical water levels in swamps, marshes, open water, or for newly constructed wetlands and ponds.
- To provide drainage by the removal of surface runoff water or groundwater.
- To transfer wastewater for utilization as part of a waste management system.

CRITERIA

The efficiency of units, type of power, quality of building, automation, and accessories installed shall be in keeping with the value and importance of the system, shall accomplish the conservation and environmental objectives.

Design shall follow the requirements for pump drainage in Section 16 of the National Engineering Handbook.

Requirements for irrigation pumping are in Section 15 of the National Engineering Handbook.

The installation and operation of the pumping plant shall comply with all federal, state, local laws and regulations.

Pump requirements. The capabilities, range of operating lifts, and general class and efficiency of equipment shall be determined from the manufacturers pump data. The size and number of pumps and their performance requirements shall be determined on the basis of the requirements of the system. The total head shall be determined for critical operating conditions, taking into account all hydraulic losses. Automatic controls shall be included in the plans as required.

Pumping plants installed to provide an outlet for drainage shall have a capacity equal to the maximum discharge capacity of the tile draining to the pump, plus 10 percent.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Minimum drainage coefficients required are given in the following table:

Crop Type	Surface Runoff or Surface Runoff and Tile Water (inches/day)	Tile Water Only (inches/day)
Field Crops		
Mineral Soils	1/2	3/8
Organic Soils	3/4	1/2
Special (Truck) Crops		
Mineral Soils	3/4	1/2
Organic Soils	1 1/2	3/4

Power units. The power units shall be selected on the basis of costs, operating conditions, conservation needs, and objectives, including need for automation. The power unit shall be matched to the pump and be capable of operating the pump effectively within the range of operating conditions.

The horsepower requirements, pump efficiency, and total head on the pump shall be computed.

Suction and discharge pipes. The size of suction and discharge pipes shall be based on studies of efficiencies and effects on costs and operations. The arrangement and length of discharge pipe shall be based on the need for recovery of head through symphonic action, and for delivery of water in keeping with conservation and environmental objectives. Gates, valves, pipe connections, discharge bays, and other protective works shall be installed, as needed, for satisfactory plant operation.

Measures to control erosion at the intake or outlet of the pump station shall be incorporated into the design.

Building and accessories. The design of the plant and if required, associated housing, shall consider the need for protecting equipment from the elements, malicious damage, fire and also the need for equipment maintenance and repairs. The appearance of the plant shall be in keeping with its surrounding environment and its importance or value.

The foundations shall be designed to safely support the loads imposed. Sheet piling or other measures shall be used, as required, to prevent piping beneath the foundation.

Pumps may be mounted in the open, on piling, or in well or pit.

Suction bays (or sumps) shall be designed to conform to the hydraulic characteristics established by the pump manufacturer.

The discharge bay or connection with distribution system shall be ample to meet hydraulic and structural requirements.

Provisions for repair or removal of pumps and engines shall be provided.

Trash racks shall be provided, as needed, to exclude debris and trash from the pump.

All structural features and equipment shall provide adequate safety features to protect workers and public against injury

CONSIDERATIONS

- Downstream flows or aquifer recharge volumes may be affected by this practice. Existing ground water hydrology could be impacted by this practices.
- Possible effects on water quality, especially irrigation water discharge.
- Protection of system components from storm events should be considered.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing pumping plants for water control shall be in keeping with this standard and shall describe the requirements for properly installing this practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

An Operation and Maintenance plan specific to the facilities installed shall be prepared for use

by the landowner or operator responsible for operation and maintenance. The plan shall provide instructions for operating and maintaining facilities to ensure they function properly.

As-Built Plans, specifications and equipment data shall be incorporated into the O & M Plan.